

Factors Affecting Onion Consumption in the United States

Gary Lucier, Biing-Hwan Lin, and Jane Allshouse¹

Abstract: Fresh and processed dry bulb onion consumption has increased significantly in the United States over the past two decades. However, little is known about the distribution of onion consumption across different marketing sectors, geographic regions, or population groups. Using data from USDA's 1994-96 and 1998 Continuing Survey of Food Intakes by Individuals, this article examines the consumption distribution of fresh and processed onions in the United States. The analysis indicates that per capita fresh dry bulb onion consumption is greatest in the western areas of the country, while processed onions are generally more popular in the Northeast. The majority of onions and processed onion products are consumed at home. The analysis indicates that men consume about 40 percent more onions than women.

Keywords: Onions, consumption, per capita use, distribution, regions, dehydrated, frozen.

There has been continuing interest in information regarding the consumption distribution of foods such as onions. Although a great deal is known about the supply side of the U.S. fresh and processed (frozen, canned, dehydrated) dry bulb onion markets, relatively little has been published about consumer demand. According to per capita disappearance data compiled by the U.S. Department of Agriculture's (USDA) Economic Research Service (ERS), both fresh and dehydrated onion demand have trended higher over the past three decades. While the trend in processed (dehydrated) onion use has been almost flat with only a slight upward trend over the past 30 years, fresh onion consumption has experienced a strong upward trend, with use nearly doubling over the period (table A-1). During the most recent 3 years (1998-2000), average use of all onions increased 74 percent over the 1968-70 period.

A combination of factors, including immigration trends and changes in America's tastes and preferences, has likely contributed to rising per capita onion use. However, due to a lack of consumer research in this area, little is known about the demographics of fresh and processed onion consumption. For example, what proportion of fresh and processed onions are purchased for at-home versus away-from-home meals? Has the increasing Hispanic population in the U.S. influenced fresh onion demand the way it has other vegetables? Who consumes onions? These questions have largely gone unanswered.

The purpose of this article is to provide unique basic information about the market distribution of fresh and processed onions using data from USDA's most recent food consumption surveys. Following a short discussion of the data used in the analyses, the next sections will describe the distribution of fresh and processed onion consumption by food source, region of the country, ethnic background, income class, and age and gender. Market distribution analyses will

Table A-1--U.S. dry bulb onions: Per capita use

Year	Fresh market 1/	Dehydrating	Total
Pounds, fresh-equivalent			
1960	--	--	12.3
1965	--	--	11.4
1970	10.1	1.2	11.3
1975	10.5	2.0	12.5
1980	11.4	.8	12.2
1985	13.6	1.6	15.2
1990	15.1	2.0	17.1
1995	18.0	1.3	19.3
1996	18.7	.9	19.6
1997	19.1	.9	20.0
1998	18.6	1.1	19.7
1999	18.9	2.4	21.3
2000	18.9	1.8	20.7
2001f	18.9	1.3	20.2
Decade averages:			
1960s	--	--	11.8
1970s	10.8	1.4	12.2
1980s	13.0	1.5	14.5
1990s	17.5	1.5	19.0

f = ERS forecast.

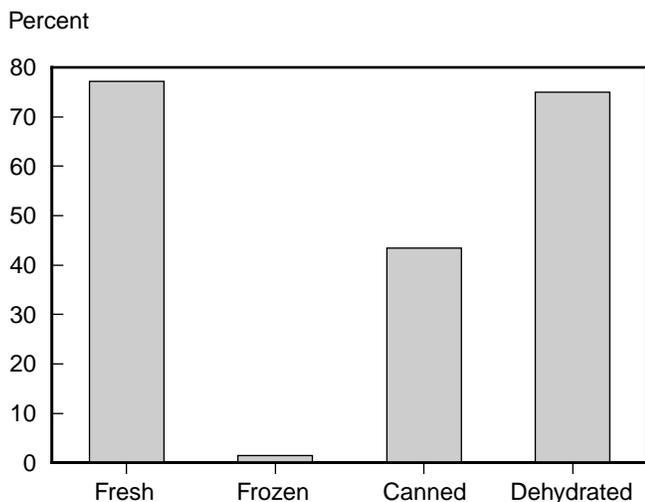
1/ Includes onions destined for canning and freezing. Fresh and dehydrating combined prior to 1970.

Source: Economic Research Service, USDA.

¹ Lucier is an economist with the Market and Trade Economics Division. Lin and Allshouse are economists with the Food and Rural Economics Division, Economic Research Service, USDA.

Figure A-1

Percent of consumers reporting onion consumption on any given day



Source: Economic Research Service, USDA.

be presented for fresh and total processed onions and also for the major processed categories—dehydrated, frozen, and canned/glass-packed products.

Data and Methodology

USDA has conducted periodic surveys of household and individual food consumption in the United States since the 1930s (see box). The most recent surveys, the 1994-96 and 1998 Continuing Survey of Food Intakes by Individuals (CSFII)², conducted by USDA's Agricultural Research Service (ARS), provided the basis for this article. Each year of the 1994-96 data set comprises a nationally representative sample of non-institutionalized persons residing in 50 States and Washington, D.C. The 1998 CSFII was a supplemental survey to the 1994-96 CSFII. The supplemental survey was strictly focused on children (see the box for more detail).

In the CSFII, 2 nonconsecutive days of dietary data for individuals of all ages were collected 3 to 10 days apart through in-person interviews using 24-hour recalls. The 1994-96 CSFII data set includes information on the food and nutrient intakes of 15,303 individuals, while the 1998 CSFII data set includes 5,559 children who were up to nine years of age.

The respondents provided a list of foods consumed as well as information on where, when, and how much of each food was eaten. Standardized probes were used to collect details on food descriptions and amount of food eaten. The location where the food was purchased was coded into several cate-

² U.S. Department of Agriculture, Agricultural Research Service, 1998. 1994-96 Continuing Survey of Food Intake by Individuals and 1994-96 Diet and Health Knowledge Survey. CD-ROM. Available from National Technical Information Service, Springfield, VA.

gories. For each respondent, an array of economic, social, and demographic characteristics were also collected. This rich database enables researchers to estimate the market/consumption distribution of a food by numerous delineations.

Onion Markets and Use

Although not a major plate vegetable, onions rank fifth among all vegetables in terms of both consumption and value. Total onion consumption in 2000 was, at 20.7 pounds per capita, just under the record high of 21.3 pounds set the previous year (table A-1)—only potatoes, tomatoes, lettuce, and sweet corn are higher. From 1998 to 2000, farm cash receipts for onions averaged \$737 million—5 percent of receipts for all vegetables—with an estimated retail value of over \$2 billion. The U.S. is the world's third-largest producer of onions (behind China and India), with production up 44 percent between 1988/90 and 1998/2000.

While the fresh market accounts for the largest share of onion use, other forms also account for a significant share. Most onions used in canning and freezing are taken from fresh-market varieties, while dehydrated products use separate varieties having higher solids content. Onions in frozen form are estimated to account for as much as 10 percent of all onions consumed. Both fresh-market and dehydrated onions (largely granulated and powder) appear in a wide variety of canned and frozen products such as salsa, soups, stews, salad dressings, and pickled products. Some fast-food hamburgers are topped with dehydrated (reconstituted diced/minced) onions. Dried and dehydrated onion products are manufactured for both domestic and export markets.

Per capita use of onions has generally been expanding since the 1970s. However, since peaking in 1997, fresh use (includes freezing and canning) appears to have reached a plateau of about 19 pounds per person. This is 27 percent above the 1988-90 average and 67 percent above 1978-88. Per capita use of dehydrated onions averaged 1.8 pounds (fresh-weight basis) during 1998-2000—about the same as 1988-90, but a third higher than 1978-80.

Onion demand during the 1970s rode the increasing popularity of fast-food hamburger chains that featured onions on burgers and onion rings as side orders. In the 1980s, the booming popularity of salad bars added another layer to onion demand. By the end of the decade, onion demand was gaining from the growing popularity of pizza, pasta, salsa, and other ethnic cuisine. The booming economy of the 1990s has propelled demand for away-from-home foods, many of which feature onions. Onions also have natural qualities that make them attractive to consumers, particularly in today's health-conscious market. Research has shown that onions contain antioxidants, can reduce blood cholesterol levels, are low in calories, and are a source of dietary fiber. Bulb onions

Table A-2--U.S. dry bulb onions: Consumption distribution by fresh and processed product

Item	Population	All onions	Fresh-market onions	Processed onions	Frozen	Canned	Dehydrated
Percent							
Food sources:							
Home	97.6 1/	71.8	66.8	79.3	63.0	80.4	79.3
Away from home	56.2 1/	28.2	33.2	20.7	37.0	19.6	20.7
Fast food	26.6 1/	9.4	12.0	5.4	30.4	4.3	5.1
Other restaurant	17.3 1/	13.2	15.2	10.2	5.4	12.1	9.2
School	6.8 1/	1.7	1.7	1.6	1.1	.8	2.2
Others	21.4 1/	4.0	4.3	3.5	.1	2.5	4.2
Census region:							
Northeast	19.6	19.5	17.7	22.2	14.0	23.3	21.8
Midwest	23.5	23.9	24.4	23.3	15.3	18.4	26.9
South	34.9	32.3	32.3	32.2	33.6	34.2	30.8
West	22.0	24.3	25.6	22.4	37.0	24.2	20.5
MSA status:							
Metropolitan	32.0	33.2	31.0	36.4	38.5	38.3	35.0
Suburban	46.9	46.4	46.1	47.0	42.4	45.2	48.3
Rural	21.1	20.4	22.9	16.7	19.1	16.5	16.7
Race/ethnic origin:							
White, non-Hispanic	72.6	71.9	72.1	71.6	67.9	66.3	75.4
Black, non-Hispanic	12.6	10.6	9.2	12.7	8.2	14.5	11.7
Hispanic	10.5	12.0	13.8	9.4	13.4	10.2	8.7
Others	4.4	5.5	4.9	6.3	10.5	9.0	4.2
Household income as a percentage of poverty:							
Under 130 percent	19.2	18.7	19.2	18.0	22.5	19.3	16.9
131-350 percent	41.8	40.4	39.9	41.0	39.0	38.4	42.9
Over 350 percent	39.0	41.0	40.9	41.0	38.5	42.3	40.3
Gender and age:							
Male, all	49.0	57.3	58.4	55.7	51.9	54.4	56.7
Male, 2-11	9.0	4.7	4.4	5.1	3.7	2.8	6.7
Male, 12-19	5.9	6.1	6.7	5.3	8.9	3.9	6.0
Male, 20-39	16.0	23.3	23.4	23.1	12.5	24.8	22.4
Male, 40-59	11.6	15.6	16.1	15.0	20.1	15.0	14.8
Male, 60 and over	6.7	7.6	7.8	7.2	6.6	7.8	6.8
Female, all	51.0	42.7	41.6	44.4	48.1	45.6	43.3
Female, 2-11	8.5	4.0	3.7	4.5	5.4	2.3	6.0
Female, 12-19	5.7	4.7	4.6	4.9	4.9	4.1	5.5
Female, 20-39	15.9	15.2	14.9	15.6	18.0	16.0	15.2
Female, 40-59	12.1	11.3	11.2	11.6	8.4	14.3	9.9
Female, 60 and over	8.6	7.5	7.4	7.7	11.5	8.9	6.7

1/ Percent of population consuming at least one food at the specific location.

Source: U.S. Department of Agriculture, Agricultural Research Service., 1998. 1994-98 Continuing Survey of Food Intake by Individuals and 1994-96 Diet and Health Knowledge Survey. CD-ROM. Available from National Technical Information Service, Springfield, VA.

also provide vitamin C, with one medium onion providing 15 to 20 percent of the daily requirement.

Market Share by Location

In the CSFII survey, the "at home" and "away from home" delineation is based on where a food was obtained or prepared, not where it was consumed. Food at home is generally obtained at a retail store such as a supermarket, grocery store, or convenience store. Food away from home is generally purchased from foodservice establishments, but can also be obtained in such places as school cafeterias, community feeding programs, or child/adult care centers.

Both home and away-from-home food can be consumed at or away from home. For example, a bagged lunch prepared at home and consumed at work is classified as home food. A commercially prepared pizza delivered and consumed at

home is classified as food away from home. Fast-food places include self-service establishments and carryout places; restaurants are places that have wait staff; and school cafeterias include daycare facilities and summer camps. The survey indicated that on any given day, 55 percent of the population ate at least one food away from home, with 31 percent visiting fast-food establishments. The category "others" is a catchall category, including such things as community feeding centers, bars and taverns, vending machines, etc.

According to the CSFII survey, the bulk (72 percent) of fresh and processed onions were purchased at retail stores and considered as home foods (table A-2). Processed onions were more likely to be consumed at home (79 percent) than fresh-market onions (67 percent). This reflects both the strong use of fresh onions in the foodservice industry and

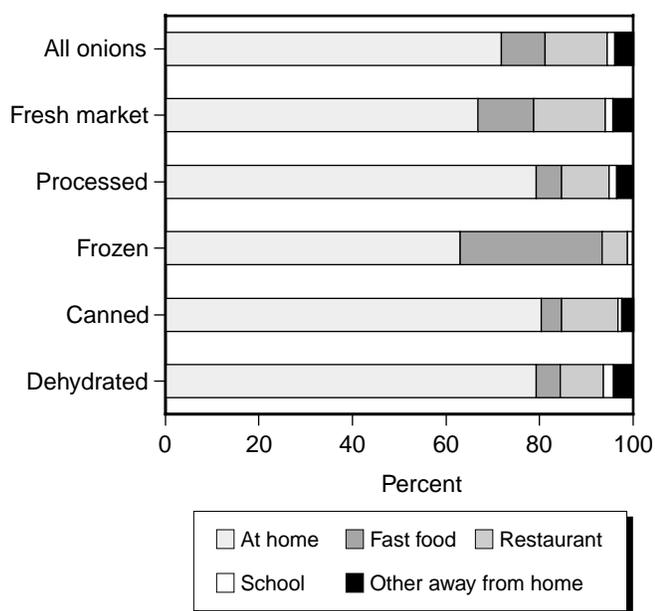
the predominance of onions in manufactured foods purchased from retail establishments.

The fact that two-thirds of fresh-market dry bulb onions are purchased at retail for home use is relatively consistent with the overall percentage of meals consumed away from home during the survey period. Although the preparation of meals at home is not necessarily a dying art, “eating out” has become much more prevalent during the past two decades as consumer affluence has risen and “free time” has become more dear. About 15 percent of fresh-market onions were consumed in food prepared in standard restaurants (those with wait staff). The popularity of various ethnic restaurants (e.g. Italian, Mexican, Indian, Chinese, etc) during the 1990s has likely aided growth in onion demand. Entrees (prepared on-site), salads, and side dishes such as rings and fried/baked specially-sliced whole onion appetizers likely form the backbone of restaurant demand for fresh-market onions. Fast food is the other major away-from-home source for fresh-market onions. Consumers obtained 12 percent of their fresh onion intake from fast foods. Sandwiches (hamburgers, subs, etc), ethnic foods (Mexican, Indian, etc), and toppings for pizza were likely the major avenues for consumers to inject fresh-market onions into their diets.

Consumers purchased 37 percent of their frozen onion products from the foodservice market—the greatest percentage of away-from-home purchases among the 4 onion market segments. The largest share of frozen onion products (30 percent) were purchased from fast food establishments, with fried onion rings (made from both diced and whole rings) likely the top product (fig. A-2).

Figure A-2

Consumption of dry bulb onions by food source



Source: Economic Research Service, USDA.

The category termed “canned onions” also encompasses products commonly packed in glass jars such as salsa and tomato-based sauces—onions are an important seasoning agent in these products. The survey indicated that about 80 percent of onions sourced from canned products are purchased at retail for home consumption. The increasing prevalence of convenience-oriented products such as spaghetti sauces and ready-to-eat soups and stews, plus the rise of salsa as a major condiment/dip, has added strength to a canned category traditionally held by onion-containing products such as pickles, taco sauces, bottled onions, and canned vegetable mixtures.

Dehydrated onions are used in hundreds of manufactured food products ranging from catsup to cured meat products. By volume and dietary influence, this is the most important market segment for processed onions with 58 percent of all processed onions purchased in dehydrated form. About 79 percent of dehydrated onions are purchased directly from, or are contained in, foods purchased in retail establishments.

Onion Use by Region and Urbanization

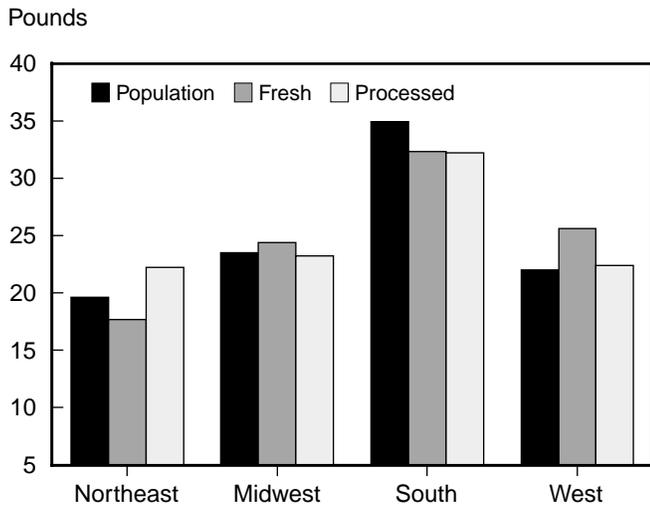
The CSFII data indicated that, with some exceptions, onion consumption is relatively evenly distributed among the four Census regions. The 4 Census-defined regions are Northeast (20 percent of the population), Midwest (24 percent), South (35 percent), and West (22 percent). In general, total per capita onion consumption was fairly uniform across all four regions. As table A-2 shows, total dry bulb onion consumption (fresh and processed) was strongest in the West and weakest in the South. Total onion consumption in the Northeast and Midwest was almost directly proportional to the share of national population.

The survey data indicate that on any given day, fresh-market onion consumption is greatest in the West and weakest in the Northeast (fig. A-3). About 26 percent of fresh onions are consumed in Western States, where per capita consumption is more than 25 percent higher than in the Northeast (18 percent of consumption). Much of the strength in western onion consumption is likely due to the large (and growing) Hispanic population, since onions are an important component in the diets of many Hispanic consumers. Fresh consumption was also proportionately greater in the Midwest but weaker in the South. Although Census data indicate that Hispanics are also an important subgroup in the South, their consumption impact was apparently offset by weak fresh onion consumption among black consumers.

Consumption of processed onions was strongest in the Northeast and Midwest and weakest in the South. The Northeast, consisting of New York, New Jersey, Pennsylvania, Connecticut, Rhode Island, Massachusetts, Vermont, New Hampshire, and Maine, contains less than 20 percent of the Nation’s population but accounts for 22 percent of processed onion consumption. Although the

Figure A-3

U.S. population and dry bulb onion consumption by region



Source: Economic Research Service, USDA.

Northeast was a weak consumer of frozen onion products, this region was strong in canned and dehydrated onion consumption. The West dominated frozen onion consumption, with 37 percent of frozen products consumed by 22 percent of the Nation’s population. People in the Midwest consumed proportionately greater amounts of dehydrated onions than any other region. This may in some way be a reflection of the traditional midwestern values featuring more at home meals, since the majority of dehydrated onion is consumed as at-home foods.

About 47 percent of American consumers resided in suburban areas, 32 percent live in metropolitan cities, and 21 percent live in rural areas. Fresh-market onion consumption was slightly stronger in rural areas, while overall processed onion consumption was favored in metropolitan areas and proportional to the population share in the suburbs. However, processed onion consumption was uniformly weak in rural areas. Per capita use of frozen and canned onions was strongest in metropolitan America, while dehydrated onions were favored in both metropolitan and suburban areas.

Racial/Ethnic Makeup of Onion Consumers

Table A-2 provides consumption breakdowns for the top three racial groups (white, black, Hispanic) and all others (two-thirds of which is Asian). On any given day, Hispanics and other ethnic groups (largely Asians) were found to more intensively consume fresh-market onions. Likely reflecting traditional diets steeped in fresh produce, Hispanics consume one-third more fresh onions per capita (market share divided by population share) than do white consumers. Non-Hispanic whites consumed fresh onions almost in direct pro-

portion to their percentage of the population during the 1994-96 and 1998 survey periods. At the same time, non-Hispanic black consumers reported per capita fresh onion consumption about 25 percent below that of whites. Hispanics represented 10.5 percent of the U.S. population and accounted for nearly 14 percent of fresh-market onion consumption. Demographers expect rapid growth in the Nation’s Hispanic population over the next few decades, which bodes well for the onion industry.

While frozen onion products (such as onion rings) appeared to be most popular among consumers of Hispanic and other ethnic heritages, they were not as appealing to black or white consumers. For onions consumed in canned products (salsa, soups, sauces, etc.), blacks and other ethnic groups were strong consumers, with blacks consuming 26 percent more onions in canned products per capita than whites. Whites accounted for three-fourths of the volume of dehydrated onions (chopped, powder, etc) consumed in the United States—the only racial group consuming more than its respective population share.

Onion Use and Income

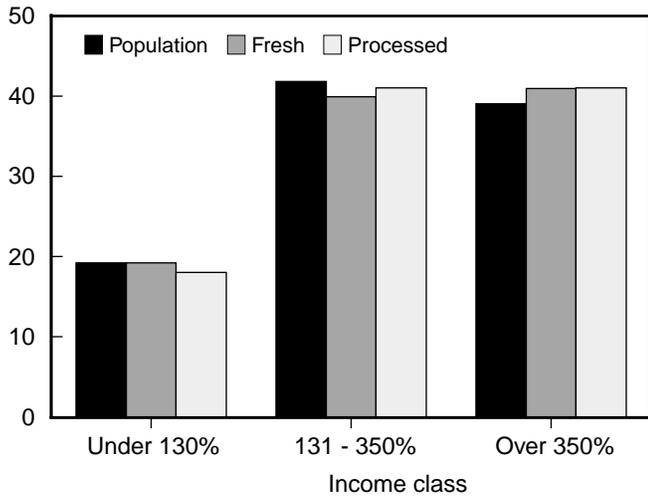
In the CSFII survey, households were classified into three income brackets using the Federal poverty guidelines. As a matter of reference, the Census Bureau reported that the weighted-average poverty income threshold for a 4-person household was \$15,961 during 1994-98 (derived from *Statistical Abstract of the United States, 2000*). The poverty guideline was developed by the U.S. Dept. of Health and Human Services for the implementation of Federal food programs. Some Federal food programs, such as the Food Stamp Program, have used 130 percent of the poverty level to determine eligibility for participation. It is used in this study as the top end of the low-income category. About 39 percent of households had income exceeding 350 percent of the poverty level (high-income households); 42 percent of households had income falling between 130 and 350 percent of the poverty level (middle-income households); and 19 percent of households had income below 130 percent of the poverty level (low-income households).

In general, per capita onion consumption was greatest within the high-income bracket, although the range from low- to high-income consumers was relatively narrow (fig. A-4). Households in the highest income bracket, with income greater than 350 percent of the poverty level, represented 39 percent of the U.S. population and consumed 41 percent of fresh onions. This likely reflects the relative strength in away-from-home consumption (especially use in standard restaurants) for fresh-market onions. Upper income consumers are more likely to eat at such places. At the other end of the income spectrum, low-income consumers account for 19 percent of the population and consume 19 percent of fresh onions.

Figure A-4

U.S. dry bulb onion consumption and income

Household income as a percentage of poverty



Source: Economic Research Service, USDA.

One of the few notable “outliers” among the income and product class relationships was for frozen onions, which were found to be most popular with low-income consumers and less popular with both middle- and high-income consumers. The survey results suggest a typical scenario for frozen onion demand to be a low-income consumer visiting a low-cost fast-food place (serving onion rings) in a western metropolitan area. This may also reflect lower consumption of fast foods by upper income consumers. Also, even though the survey sample is nationally representative, the number of respondents reporting the consumption of any particular food (such as frozen onions) could still be too small to represent a market accurately.

For dehydrated onions, the largest and broadest processed onion category, per capita use increased with income, reflecting the wide range of use in manufactured foods such as specialized prepared sauces, meat products, soups, and salad dressings sold in supermarkets. In some cases, higher cost “luxury” items may be more likely to be purchased by those who can afford them, while those of lesser means may be more likely to prepare sauces and soup from scratch. The distinction in consumption was greatest between the low-income bracket and the middle-income bracket, with a minor increase seen from the middle- to the high-income group.

Consumption by Age and Gender

There are distinct onion consumption patterns by age. As shown in table A-2, on any given day, male consumers (perhaps because of their higher caloric intake) had higher per capita consumption of all fresh and processed onion products than females. Men consumed 58 percent of fresh-market onions and 56 percent of processed onion products. On any given day, men consume about 39 percent more onions

and onion products per capita than women. The distinction between male and female consumption is greater for fresh-market onions than for processed products.

For both men and women, per capita fresh-market onion consumption increases with age and peaks between 20 and 39 years of age (fig. A-5). Per capita use then tends to drop off slightly in middle age (more so for men than women) before falling sharply after 60 years of age back to the levels consumed during the teen years. Children between the ages of 2 and 11 tend to consume very few onions of any type, with per capita consumption for both male and female about one-half the average for all age groups.

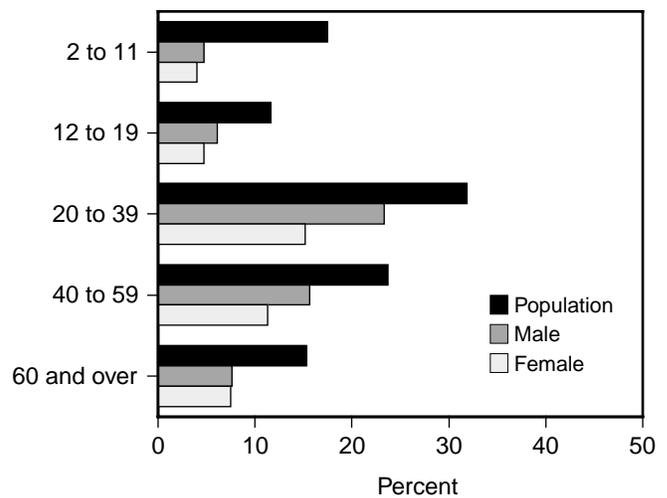
Children under the age of 12 account for 18 percent of the population but consume less than 9 percent of all onions. Not surprisingly, dehydrated onion consumption, although still low, was the strongest among the onion categories for these children. This largely reflects the hidden nature of dehydrated onions as most are consumed as ingredients of manufactured foods.

Children apparently begin to acquire a taste for onions once they reach the teen years. Teens (defined here as ages 12-19) account for 11 percent of the population and consume 11 percent of all onions. Teenage boys are important consumers of frozen onions (likely onion rings) and fresh onions, while teenage girls consume onions at a lower but more consistent rate across product forms.

The CSFII survey indicated that men between the ages of 20 and 39 were the largest consumers of fresh onions, representing 16 percent of the population and consuming 23 percent of all onions. Women in this same age group, although continuing to lag behind men in terms of use, also reported

Figure A-5

U.S. dry bulb onion consumption by sex and age



Source: Adapted by ERS from data provided by ARS, USDA.

USDA Food Consumption Data

USDA collects and compiles two major data sets on food consumption in the United States: the Food Supply and Utilization, or food disappearance data, compiled by ERS, and the Continuing Survey of Food Intakes by Individuals, compiled by ARS. Both data sets are key components of ongoing Federal efforts to monitor the nutritional health and dietary status of U.S. consumers. They were mandated by Congress under the National Nutrition Monitoring and Related Research Act of 1990. When used together, they provide a comprehensive picture of the Nation's eating habits.

Food Supply and Utilization Data, also known as food disappearance data, measures the flow of raw and semi-processed food commodities through the U.S. marketing system. They are neither a direct measure of actual consumption, nor of the quantity of food actually ingested. The total amount available for domestic consumption is estimated as the residual after exports, industrial uses, seed and feed use, and year-end inventories are subtracted from the sum of production, beginning inventories, and imports. The use of conversion factors allows for some subsequent processing, trimming, spoilage, and shrinkage in the distribution system. However, the estimates also include residual uses for which data are not available (such as miscellaneous nonfood uses, and changes in retail and consumer stocks).

With data back to 1909 for most commodities, the food disappearance data are useful as indicators of trends over time. The data are most commonly used to measure the average level of food consumption in the country, to show year-to-year changes in consumption of major foods, to calculate the approximate nutrient content of the food supply, to establish long-term consumption trends, and to permit statistical analyses of effects of prices and income on food consumption. Because they include spoilage and waste accumulated through the marketing system and in the home, the data typically overstate actual consumption. A 1997 ERS study suggested that such losses may exceed 25 percent of the edible food supply.

Food disappearance data reflect the amount of major food commodities entering the market, regardless of their final use. Final product forms and consumption locations are not usually known, and little or no data exists on supplies of further processed products. In short, relatively good information exists for many food ingredients, but not for foods as actually eaten. For example, the food disappearance data provide a good estimate of the annual per capita consumption of onions, but provide no information on products consumed—fresh, frozen, canned; where the onions/products were marketed—supermarket, hospital, school, restaurant, or food manufacturer; how they were

consumed—in salsa, on hamburgers, or on pizza; how they were prepared—cooked from scratch or reheated from a canned or frozen product; or the socioeconomic characteristics of the consumer that ultimately ate the food.

Data used in this paper are taken from USDA's **Continuing Survey of Food Intakes by Individuals (CSFII)**, 1994-96 and 1998. The 1998 CSFII is a supplemental survey of children to the 1994-96 CSFII, which is a national representative sample. The 1998 CSFII adds intake data from 5,559 children (from birth through age 9 years) to the intake data collected in 1994-96. The CSFII measures foods actually eaten by individuals. The survey records food intake over a specific period of time (two non-consecutive days in 1994-96 using 24-hour dietary recalls). The survey collects demographic information, such as household size, income, race, age, and sex, and information on where a food was purchased, how it was prepared, and where it was eaten, in addition to food-intake data. The CSFII provides information for use in policy formation, regulation, program planning and evaluation, education, and research. For example, data from recent surveys have been used to evaluate the impact of food fortification on nutrient intakes, to estimate exposure to pesticide residues and other contaminants from foods, and to target nutrition assistance and education programs to those who need them most. The data are particularly valuable for measuring the effect of socioeconomic and demographic characteristics on food consumption.

In this study, we make use of the Food Commodity Intake Database (FCID) from the Environmental Protection Agency. FCID contains human food consumption data expressed in terms of agricultural food commodities on 5,831 different foods and beverages people of different ages reported eating in 1994-96 and 1998. FCID provides the edible amount of agricultural food commodities contained in each food reported eaten in CSFII. There are four food commodities for dry-bulb onions including; 1) fresh dry bulb; 2) fresh in baby food, 3) dried/dehydrated; and 4) dried/dehydrated in baby food. A factor of 9 is used to convert dry weight to fresh dry bulb weight.

The intake data show where and how much of the food was consumed. The 1994-96 CSFII data include a sample weight for each respondent, indicating the number of people the sample represents. The share of an onion product by location can be estimated by calculating the weighted sum of the product consumed in each location. Similarly, the socioeconomic and demographic characteristics of the respondents can be used to estimate the consumption share of onions by these characteristics.

peak onion consumption—approaching the level of their population proportion. As men and women approach middle age, their per capita use of all onions fades only slightly, with relatively strong consumption still evident. However, the survey indicated that total onion consumption begins to drop after age 59 for both men and women.

Conclusion

While much is known about the supply side of the U.S. onion markets, little is known about the consumer side of the market. In this paper, using data from USDA's CSFII survey, we show where and how much fresh and processed onion products are consumed and link this consumption to consumers' economic, social, and demographic characteristics. The important findings in this article include;

- The bulk of fresh and processed onions were purchased at retail stores and considered as home foods. Likely reflecting the influence of fast-food onion rings, 37 percent of frozen onions were purchased away from home, with most bought at fast-food places;
- Fresh-market onions were favored slightly more in the West and Midwest and less so in the Northeast and South. Consumption of processed onion products was strongest in the Northeast and weakest in the South.
- Hispanics were the strongest consumers of fresh-market onions. Compared with other consumers, fresh onions were discovered to be relatively less important in the diets of non-Hispanic black consumers.
- Per capita consumption of fresh and processed onions was greatest in the high-income category. Households in this income bracket, with income greater than 350 percent of the poverty level, represented 39 percent of the U.S. population and consumed 41 percent of both fresh and processed onions.
- The survey indicated that men consume nearly 40 percent more onions per capita than women.
- Children apparently do not begin to acquire a taste for onions until the teen years. Total onion consumption appears to peak for both sexes between the ages of 20 and 39 and remains relatively strong through the middle-age years.